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OUT OF PRINT

N. A. C. A. BULLETIN

Vol. XII, No. 23 August 1, 1931

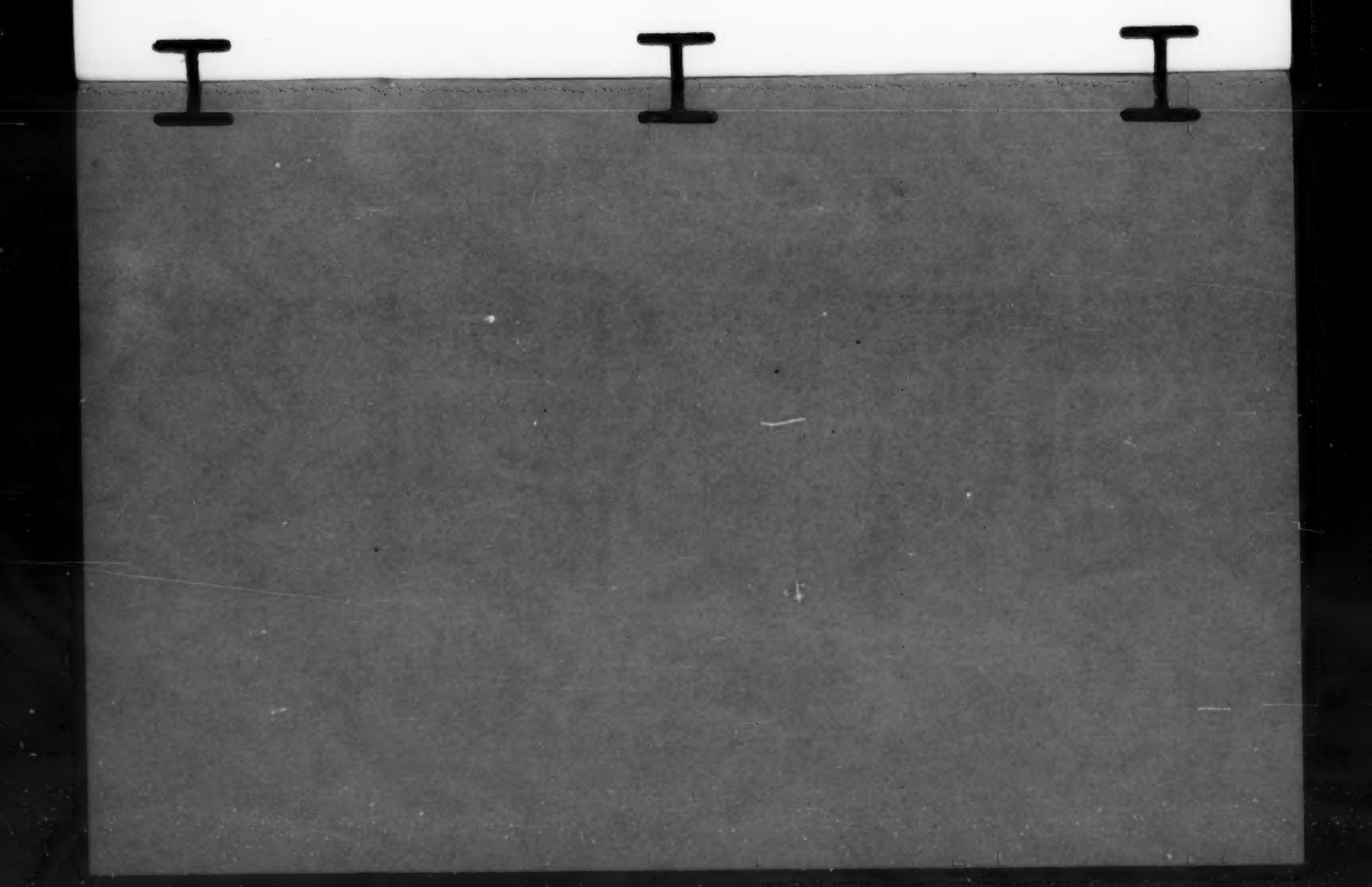
IN TWO SECTIONS

Section I

N.A.C.A. LIBRARY

The Installation of Standard Costs

This bulletin is published semi-monthly by the National Association of Cost Accountants, 1790 Broadway, New York, Subscription price $15.00 per year. Entered at the Post Office, New York, N. Y., as second class matter August 28, 1925, under the Act of March 3, 1879.



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The Installation of Standard Costs

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EDITORIAL DEPARTMENT NOTE

Periodically a re-statement of fundamentals on any subject is necessary, but as a subject becomes more and more widely adopted and understood such re-statement of principles must present a well-developed, generalized picture of the subject. Standard costs is not a new subject, for it is not only a very simple plan of cost accounting but it is one of the oldest plans. Despite many sessions of our various chapters and conventions devoted to the subject, however, many of our members find it necessary to lose themselves in a discussion of detail when they think about the subject. It is our hope that our publications can in some way present such a clear picture of the simplified application of standard costs from time to time that this detailed thinking will gradually disappear.

Mr. Herbert J. Myers, the author of this paper, is a native of Indiana. He started his business career in clerical work with the United States Government and up to 1923 was doing work outside the field of cost accounting, first with Lyon & Healy of Chicago, and later with the Fred M. Lawrence Company. He returned to Lyon & Healy in 1923 as Factory Accountant, and, after a brief period in California, came back to Chicago with the Wm. Wrigley Jr. Co. in 1928 as a special accountant. In 1929 he went with the United States Radio and Television Corporation at Marion, Indiana as Comptroller, where he has devoted a considerable part of his time to the application of standard costs in this many-sided, intricate, industrial picture. He will be remembered as the winner of a first prize in the Jordan prize essay competition on How to Set Standards. His paper was given before the Indianapolis chapter at its January, 1931, meeting, of which chapter he is a very active member.

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AUGUST 1, 1931

THE INSTALLATION OF STANDARD COSTS

ALTHOUGH we have been talking about standard costs for the past ten years and most of us have adopted something we called standard costs, as yet we are but very little closer to the general use of standard cost accounting than we were when we started talking about them. This being true, then it behooves us as progressive industrial accountants to get down to real work and start applying some of the things we have been talking about. In other words, a little less "talkie" and a little more "movie".

There is use for standard cost accounting in all business. However, we think standard costs aren't practical in a special order business or in a non-standardized business, or in a business which by its nature is perpetually changing styles, models, etc. This is the very type of business that can least afford to get along without standard cost accounting.

I feel sorry for the industry that will not learn to use standard cost accounting, if only one company in that industry once did start using it. We ought to know the answers to the following questions if we are going to understand the fundamentals.

1. What are standard costs?

A1. A very carefully determined quantity of material extended at a fixed basic price, plus a fixed standard time extended at a fixed basic labor rate, plus a carefully determined burden standard based on a break-even volume.

2. What is standard cost accounting?

A2. Standard Cost Accounting is a method of collecting and reporting daily, all variations from the accepted standard cost.

3. What does standard cost accounting do?

A3. It keeps management informed daily of how far actual operations are varying from standard, thereby enabling the management to control operations and thus keep them within profit-making possibilities.

4. What are its benefits?

A4. The benefits are:

1. Greater profits if its warnings are heeded.
2. Greater accuracy than any so-called actual cost can ever be.
3. Greater simplicity and its attendant reduced clerical help.

4. It provides a means of control (not control, in itself, because management, under any system, must do the controlling). No system controls, any more than machines without attendants can produce your products.
5. Quicker closing each month.

We are in business for the sole purpose of making profits. We are not only manufacturing radios, tires, automobiles, clothing, etc., we are doing all this it is true, but in addition, we are trying to make profits and unless anything we do contributes toward profits, it has no place in business, and sooner or later business will eliminate everything which cannot contribute to profits. The best proof of whether any system is good is whether it helps make profits.

Standard cost accounting where used to its fullest advantage, has proved its worth by enabling the management using it to make greater profits and make a better product and sell it for less money than is possible with the use of any historical method. Everything else being equal, a company making the same product and using historical accounting only, can not successfully compete with another using a standard cost accounting system.

Having made our premise that: First, a business exists for net profits and only because of net profits and, second, that everything else that does not contribute toward that end will not continue to exist long, and third, that the historical method of accounting has not contributed to the end of net profits except niggardly in comparison with the potential capacity of standard cost accounting, it seems then, that we must get busy and start to develop standard cost accounting methods in our own businesses. Mr. H. G. Crockett, in his talk before the Twin Cities Chapter, said, "I believe the reason standard costs have made such slow progress is that we have minimized fundamentals and rather tried to sell particular methods or phases upon which there never could be an agreement". We will make no attempt to-night to sell any method of standard cost accounting, but rather, attempt to point out the fundamentals necessary in installing standard costs.

First, we must start an educational campaign within the organization. We must get everybody to thinking and talking in terms of standard cost accounting. We must have the entire organization sold on the principle. We must get them to thinking of standard cost

accounting as a method of controlling functions rather than a method of determining the cost of an operation, a piece-part or an assembly. We know what they should cost, now we want to keep operating costs as close to standard as possible. If we watch our standards and keep actual operations within reasonable limits, we do not need to know what a piece-part actually costs. It is more important to know how much and in what percentage a certain function costs more than standard. Hundreds of parts and operations may have entered into that function, but what any one part actually costs is immaterial, but to know how far we have varied from standard on the function performed, is material.

Next, we must check up on our physical control from receiving to shipping. Without physical control we cannot have accounting control. What we mean by physical control is, having such physical controls as good steel fences, brick or concrete walls with locked doors and the keys only in the hands of employees delegated to see that nothing gets through the doors without the proper records. Physical control means making it impossible for anyone to get anything either into the plant or through any door in the plant without making the proper record to support the move. Naturally, it also implies the use of a properly designed system and the forms that go with it.

Now to get down to the requirements of the system itself; the principles and how to apply them. We could not learn just what to do in all cases in one evening because every industry and every problem requires a different application and solution. Therefore, we shall try to discover a few underlying principles which must be applied in order to develop a standard cost accounting system. We will not discuss a specific system or method, neither will we discuss generalities, but we will discuss specific principles. We will leave specific applications of these principles to the ingeniousness of each of you as you study and solve your own problems.

To start with, it may be well to state the underlying fundamental requisities:

1. We must have standards of performance for all functions.
   Standards of: a. Quantity
   b. Price

c. Performance
d. Quality

For our purposes we are mostly interested in the first three; namely, quantity, price, and performance, because these three either separately or in various combinations affect our costs and variances from standard, and the last, or quality, is a by-product which varies in direct ratio to how well we control the first three functions.

2. Next, we must develop some method of collecting and reporting the cost of the exceptions to standard. These exceptions are what are commonly called variations.

When we have (1) standards and (2) a method of collection and reporting the cost of exceptions to standard, if we have covered every function of the business, then we have a standard cost accounting system.

In order to more thoroughly understand these principles, let us go into a little more detail. Let us take the matter of standards to start with. Many accountants have argued that the failure of standard cost accounting in most such instances was due to poorly set standards. To this I take exception. While I will agree that superior work can only be done with the best tools, I maintain that failure (if such was the case) of standard cost accounting was due to improper or no application of the second principle just stated, namely, a method of collecting and reporting the variations from standard. Another reason probably was their lack of consistency; of confusing actual costs with standard costs (See Figure 1).

1.	Assume part No. 100—est. std. price			$1.00 each
2.	Actual purchase price			1.25 each
		Std.	*Actual*	*Ratio*
3.	Purchases	$50,000	$62,500	125
4.	Standard Cost (est.)		1.00	
5.	Cost Ratio		x125	
6.	Actual Cost		1.2500	

Accounting Control of Foregoing

		Std.	*Actual*	*Ratio*
7.	Purchases	$50,000	$62,500	125
8.	Cost of Sales	25,000	31,250	125
9.	Balance 25 M @ $1.00	$25,000	$31,250	
10.	Purchases { 20 M @ $1.00 / 10 M @ $7.00 }	90,000	100,000	111.11
		$115,000	$131,250	122.8 plus

11. Cost of Sales				
45 M @ $1.00.....	$45,000			
10 M @ $7.00.....	70,000			
	$115,000	$115,000	$131,250	122.8 plus
Cost Ratio	x 1228			
Actual	$131,250			

Note that line 6 checks with line 2 and proves that you can know actual costs even if standards are not very accurate, provided you are consistent.

FIGURE 1

The foregoing illustration shows how the variations enter into the accounting records and will clear the inventory records if tied up properly even though the standards are not very accurate. The second cost of sales on line 11 may raise the question of costing out a unit for $1.228 that was costed out in line 8 at a cost of $1.25 which makes two different costs for the same thing. However, we must bear in mind that this variation is a variation from our accepted standard prices due to purchasing and all we are doing when we cost out sales is to apportion this "price variation" over the sales as they go out.

In the first instance, line 8, our records told us that our cost of sales should carry 25% of standard for price variation, while in the second instance, our records told us that we should charge out to cost of sales 22.8% of standard, which would apportion this price variation on an accumulative average per cent.

While the best standards are none too good to use, frequently the benefits of a standard cost system would be delayed indefinitely if correctly set standards were first secured before developing the system. The important thing is to get the system started and improve your standards as rapidly as possible. But be sure you get reports on your variations.

First, make up complete standards of quantity for every piece-part, sub-assembly and assembly, that you manufacture, and set up a means of getting the standard on every new article to be made before you start making it.

When you have a standard of quantity, establish a basic standard price for each of the materials purchased. If you cannot get a satisfactory standard from data available, estimate one, because your standards of quantity and price must be complete or the system is worthless. When you have a complete list of quantities and basic

unit prices, make up a list of all purchased parts showing the accepted standard price of all purchased materials and give it to the purchasing agent so he can see what he has to meet or beat. You cannot expect him to make a price gain if you do not give him his standards against which to check every order placed.

When you have standards of quantity and price, you must next provide a means of tabulating the variation from standard price. This variation comes about by paying more or less than standard and is the measure of how well you are purchasing. To do this, you must provide a means of pricing and extending, at standard cost every item of material purchased on every purchase invoice, so as to pick up the variation. This variation may be picked up by charging it to a variation account, or by carrying inventory at both standard and actual and determining a cost ratio by dividing actual purchases by standard purchases.

I won't argue about the way you want to do this as it is immaterial. I have found the method of carrying inventories at both standard and actual in the subsidiary records to be, what to me seems, the simplest method. To illustrate how this works, assume—

	Sdt.	Actual	Ratio
Purchase of	$10,000	$12,000	120

One method picks up only the variation of $2,000, whereas the other method picks up the entire $12,000. It is immaterial which way this is picked up and whether the variation is shown as a cost ratio or not, but it is very important that the $2,000 be accounted for in some way. Converting variations into ratios has its advantages however. To illustrate:

1. Assume Purchases of.....	$ 10,000	Std.
"	$ 12,000	Act.
Variation	$ 2,000	
2. Then assume Purchases of.....	$400,000	Std.
"	$440,000	Act.
Variation	$ 40,000	

Under No. 1 variation of .....$ 2,000
Under No. 2 " of .....$40,000— or quite a greater loss than No. 1.

From the foregoing you can readily see that the variation in terms of amount only, means very little and at first glance you would say that No. 2 purchased to poorer advantage than did No. 1. However, if you convert them into ratios the true meaning is at once apparent. The cost ratios are as follows:

Under No. 1 cost ratio is 120
Under No. 2 cost ratio is 110

These ratios show that No. 2 purchased much better than No. 1. Unless you use cost ratios you cannot tell just how good or bad you are because it is only cost ratios that will properly measure the effect of volume on the variations.

Variations of Material Quantities:

Variations of material quantities fall under two headings:

1. Excess Usage (Used more than specification called for)
2. Spoilage

We must now design and get into use forms to report every item which enters into "Excess Usage" and "Spoilage". These forms should be priced and tabulated in some report form daily because these are the only items that can cause an operating loss, since we just learned that variations due to price are taken care of without affecting factory operations.

These reports are very simple and only need to report the quantity and part number of these parts spoiled and if you have a real physical control the production departments cannot get any material in excess of that required by specifications without an excess material requisition, which provides the necessary report of "excess usage". These excess material requisitions should be tabulated and made up in some report form daily, and compared to a standard daily allowance for these items. These are variable items and can be expected to vary more or less in direct ratio to production. This should be considered when comparing the amounts. Figure 2 shows simple illustration of the principle of material exceptions:

Material

Suppose you buy	1,000 pieces part A @ $1.25	$1,250.00
Std. cost of	1,000 pieces part A is 1.00	1,000.00
	Price Variation	$250.00

Suppose you allowed for	900 in your specifications		
Suppose you used	1,000		
Suppose you got	850 finished units		
Therefore,	900 as standard at $1.00		$900.00
and	1,000 used at $1.00		1,000.00
Loss due to excess usage			$100.00
Finished units	850		
Material issued for	900		
Spoiled	50 @ $1.00		$50.00

To Summarize the Foregoing Variations

		Variations	*Standard*
In—Finished Goods	850.00	—o—	850.00
Price Loss	250.00	250.00	—o—
Excess Usage	100.00	100.00	—o—
Spoilage	50.00	50.00	—o—
Total Purchased	1,250.00	400.00	850.00

FIGURE 2

Variations of Labor

Labor variations for our purpose fall under two classes:

1. In-efficiency.
2. Labor Rates.

In-efficiency may be broken down into any sub-divisions desired such as:

1. Falling below standard (real in-efficiency).
2. Lost Time ..... (an exception to standard).
   a. Machine break-down.
   b. Out of material.
   c. Re-operation, etc.

However, broadly speaking, the variations can only be due to two things:

1. Time of doing the operation.
2. Labor rates actually paid.

We must provide a means of reporting daily these variations. First we must know daily what the efficiency is for each department, and of the plant as a whole. From a control standpoint this is all we need to know, but in order to know what our true cost ratio is we must also take into consideration the variation of actual labor rates from those used as standard when making up our standard costs. The way to know efficiency due to time, is to provide a report of produc-

tion by departments and price and extend this production by standard time.

Then $$\frac{\text{Standard Hours}}{\text{Actual Hours}} = \%\text{ of efficiency}$$

If you are paying by piece rates with no guaranteed base rate, the only excess cost is the cost of day work allowances and other exceptions to standard operations, or spoiled parts on which preceding operations have been paid for.

In either case, you must find some way of tabulating and reporting what you get in standard value of production in comparison with what you are paying for. If you are not getting out in standard value as much as you are paying for, there is a loss. This loss is variation and you want to know about it. It should be reported daily so you must provide a report form to show this up. Figure 2A illustrates this principle:

	Std. Hrs.	*Hrs. Paid for*	*Efficiency Rate*	*Cost Ratio*
Dept. 1	100	125	90	112.5
Dept. 2	120	120	100	100.
Dept. 3	800	950	105	125.
Etc.				

FIGURE 2A

Before leaving labor variations, I wish to explain a little more what I mean by variations due to labor rates. (This, of course, does not apply to a piece rate system.) If you are paying by some incentive for gains in time, and on a 100% basis, then this formula must be used:

$$\frac{\text{(Paid Hours)}}{\text{(Std. Hours)}} \times \frac{\text{(Actual Rate)}}{\text{(Std. Rate)}} = \text{Cost Ratio}$$

Example:

Assume Paid Hours of 1,100
" Std. Hours of 1,000
" Actual Labor rate of .45 per hour
" Std. Labor rate of .50 per hour

Substitute the figures and you get the following equation:

$$\frac{1100}{1000} \times \frac{.45}{.50} = \text{Cost Ratio of } 99.0$$

Figure 3 shows a simple example of labor exceptions:

Labor

Labor is no different than purchased material. You set a standard of labor for each piece part and then you buy standard hours of work from your workmen at so much per standard hour produced. Assume you buy:

1,000 Parts B @.....	$618.75 per M
1,000 Parts B @ Std.....	600.00 "
Net Variation	$ 18.75 (Loss)

Analysis of the foregoing discloses the following:

Part B = 1.0 Standard Hour allowed to make for which you agreed to pay .60 per hour. Assume you actually paid .55 per hour—then you bought the following:

1,000 Parts B 1,000 Hours @ .60 per hr.....	$600.00
Actual Hours 1,125 @ .55 Guaranteed pay or	618.75
Net Variation (Loss)	$ 18.75

Formula to Determine Gain or Loss Due to Rates

(Act. Hours × Std. Rate) — (Act. Hours × Act. Rate) = Gain or Loss Due to Rates

Formula to Determine Gain or Loss Due to Efficiency

(Act. Hours × Act. Rate) — (Std. Hours × Act. Rate) = Gain or Loss Due to Efficiency

Then (1125 × .60) — (1125 × .55) = 56.25 Gain due to rates
(1000 × .60) — (1125 × .60) = 75.00 Loss due to Efficiency

Net Loss 18.75

FIGURE 3

Burden Variations

A means of reporting variations from burden standards must also be provided. Burden standards should be based on a break-even basis because it is a definite starting point. You may accept a budget that is more than your break-even basis, but at least you know what you have to do to break even, and that your budget, even though it is more than the break-even basis, is based on standards computed on that basis. Figure 4 illustrates how this is done and what is meant by accepting a budget of greater sales than required to break-even but still based on break-even standards:

	Preliminary Budget	%	*Break Even*	%	300,000 *Value*	%	400,000 *Value*	%
Material V	$100,000	40	$81,818.18	40	$120,000	40	$160,000	40
Labor V	50,000	20	40,909.09	20	60,000	20	80,000	20
Burden—Fixed F	25,000	10	25,000.00	12	25,000	8	25,000	6
Burden—Var. V (50% of Labor)	25,000	10	20,454.55	10	30,000	10	40,000	10
	$200,000		$168,181.82		$235,000		$305,000	

Admin. & Gen. F	20,000	8	20,000.00	10	20,000	7	20,000	5
Sales Exp. V	20,000	8	16,363.64	8	24,000	8	32,000	8
Profit	10,000	4	—o—		21,000	7	43,000	11
Total Sales	$250,000	100	$204,545.46	100	$300,000	100	$400,000	100

$$\frac{\text{Total Fixed Expense}}{100\% - (\text{Sum of all Var. Exp. \%})} = \text{Break-Even Sales Volume}$$

$$\frac{\$45{,}000}{1.00 - .78} = \$204{,}545.46$$

FIGURE 4

It is a good scheme to have a table worked up, such as the foregoing, starting at a break-even sales volume and stepping it up every hundred thousand dollars until maximum sales expenditures have been reached. It will serve as a good reference to show possibilities, but do not try to use the volume that fits your month's actual sales for the month's budget. Never use anything else but the budget accepted and used in establishing standard costs or you will not be consistent and you cannot hope to get results.

Factory Burden Variation Analysis

Producing Labor	*Budget* $60,000.00	*Actual*	*Std. Labor Value % of Budget* 125% $75,000.00	*Net*	*Variations Due to Expense*	*Volume*
Fixed Expense ..	$25,000.00	$25,000.00	$31,250.00	$6,250.00	—o—	$6,250
Variable Expense	30,000.00	40,000.00	37,500.00	*2,500.00*	*10,000*	7,500
Total	$55,000.00	$65,000.00	$68,750.00	$3,750.00	*$10,000*	$13,750

FIGURE 5

It has been claimed that fixed expense does not vary except slightly, and therefore, should not show any variations. This is erroneous because if you accept a standard of fixed expense and figure your costs on a certain sales volume and production, the standard costs then have just that portion of standard fixed burden provided for within them. Therefore, if production volume exceeds this predetermined volume by 25%, there is a variation due to volume which can be expected in fixed expense. In other words, you have gained to the extent of 25% of the standard fixed expense. You have absorbed 25% more fixed expense than you provided for in your standard budget. Therefore, you do have a variation due to volume and should show it as such.

Figure 5 illustrates a suggested method of reporting monthly burden variations. Variations can be reported daily if desired, but when setting standards for material, every item of supplies or any other expense material that can be provided for in material standards should be handled as direct material costs. Direct costs are easier to control and are more accurate than overhead costs. Therefore, if the variable burden is reduced to a minimum and added to material costs, variable expense can be made a negligible quantity and does not require daily reports if vigilance is exercised throughout the organization in controlling them. Fixed expense, it is agreed, fluctuates very little and does not require a daily report to watch it, so by process of elimination we have only non-productive labor in non-productive departments left. On this item it is advisable to have a report showing the ratio of hours worked to budgeted hours, daily and cumulative, and by departments. Most of these departments are directly influenced by production and willl vary in almost direct ratio, therefore, this must be taken into consideration. This can be checked by comparing the ratio of hours worked to standard, with the ratio of standard production to the budget.

	Daily Budget Hours	*Actual Hours Worked*	*Std. Prod.*	*Ratio to Budget*	*Ratio to Efficiency*
Non-Prod. Dept. 1	100	150		150	0
Non-Prod. Dept. 2	200	220		110	0
Productive Depts.	10,000	12,000	14,000	140	116.7

Note.—The productive departments are producing standard production at 140% of the budget. Department 1 has put in 150% as many hours as the budget. Therefore, Department 1 has exceeded its allowance by 10%. Department 2 has put in but 110% as many hours as the budget and therefore is 30% under the allowance.

Figure 6.

General and Administrative Expense

Usually this group of expense does not include any items that are influenced very much by volume of sales. In general then, it may be stated that this group of expense is more or less fixed. Therefore, our standard, or budget of these expenses will be considered as fixed, and we will either gain or lose on these expenses due to volume of sales, just exactly the same as we do with fixed factory expense. The only difference being that usually the volume of sales may be different than the volume of production.

Sales Expense

Sales expense is made up of both fixed and variable expense. These expenses must be kept separate and the standards determined separately. These should be determined by salesmen and territories as well as by lines, unless the expense proves to average about the same for all lines and territories. The same principle applies here as does to factory fixed and variable expense, except that it is sales volume that determines variations instead of production volume which is obvious to any accountant.

Standard Sales Price and Variations from Sales Price

There is only one variation from standard sale price and that is due to granting reduced prices, rebates or asking more than standard in special instances. In other words, the variation is due to changes in sales price, either authorized or otherwise. This variation should be reported and is not difficult to get. Anyone of you can easily develop a way of collecting and reporting this variation.

Who Determines Sales Price

Much has been said about costs determining sale price, and then recently much more has been said about competition determining sales price. Now I would like to ask the question: How, in the future, will sales price be determined?

I am going to be so bold as to prophesy that the sales price for the most successful manufacturer will be determined from standard costs as a basis. Competition will determine what prices will be to a large extent, but the manufacturer who has the best equipment, the best management, standard costs throughout, and really has the ability and energy to control his costs; will be the one who determines his sales price and the market price as well.

From all this we may draw a few conclusions:

1. We must have standard's throughout. They must be complete or our system will fail.
2. That we must provide a means of tabulating and reporting variations from standard for:
   a. Material
   b. Labor

c. Burden
d. General and Administrative Expense
e. Selling Expense

3. That we must make certain that the entire organization understands the principle of standard cost accounting.
4. That we must be consistent and always use standards and do not confuse standard costs with the actual costs.
5. That we must have physical control.
6. That we must train the entire organization to control costs and keep actual performance as close to the standards as possible.
7. That if we are going to get physical control we must provide our operating executives with all standards of performance pertaining to their work, and reports, showing when they vary from standard, and how much.
8. That standard cost accounting is a means of controlling the costs of functions rather than a system to determine piece-part costs.

It is evident that to make net profits, we must first have a goal that will indicate that we can make net profits. Then we must have a means of taking our bearings from itme to time as we progress toward that goal so that we will not wander too far off our course. The goal is our standards. The means of taking our bearings is our daily reports showing our variations from the standards.

When we attempt to install standard costs we must make certain that we get these two things throughout, and we then have a standard cost accounting system.

That is all there is to the system, but before we can get results we must have an organization that understands what we are trying to do to operate the system. And last and most important, we must have a management from the chief executive down to the straw boss that will heed the warnings the reports are flashing daily and will really control. Do not forget that it is the purchasing agent and the operating executives who have charge of actual operations, such as superintendents, foremen and other minor executives, who really control operating costs. It is they, especially, that we mean when referring to management. These are the real controllers in industry and not the accounting department or the department head who has the official title of controller.

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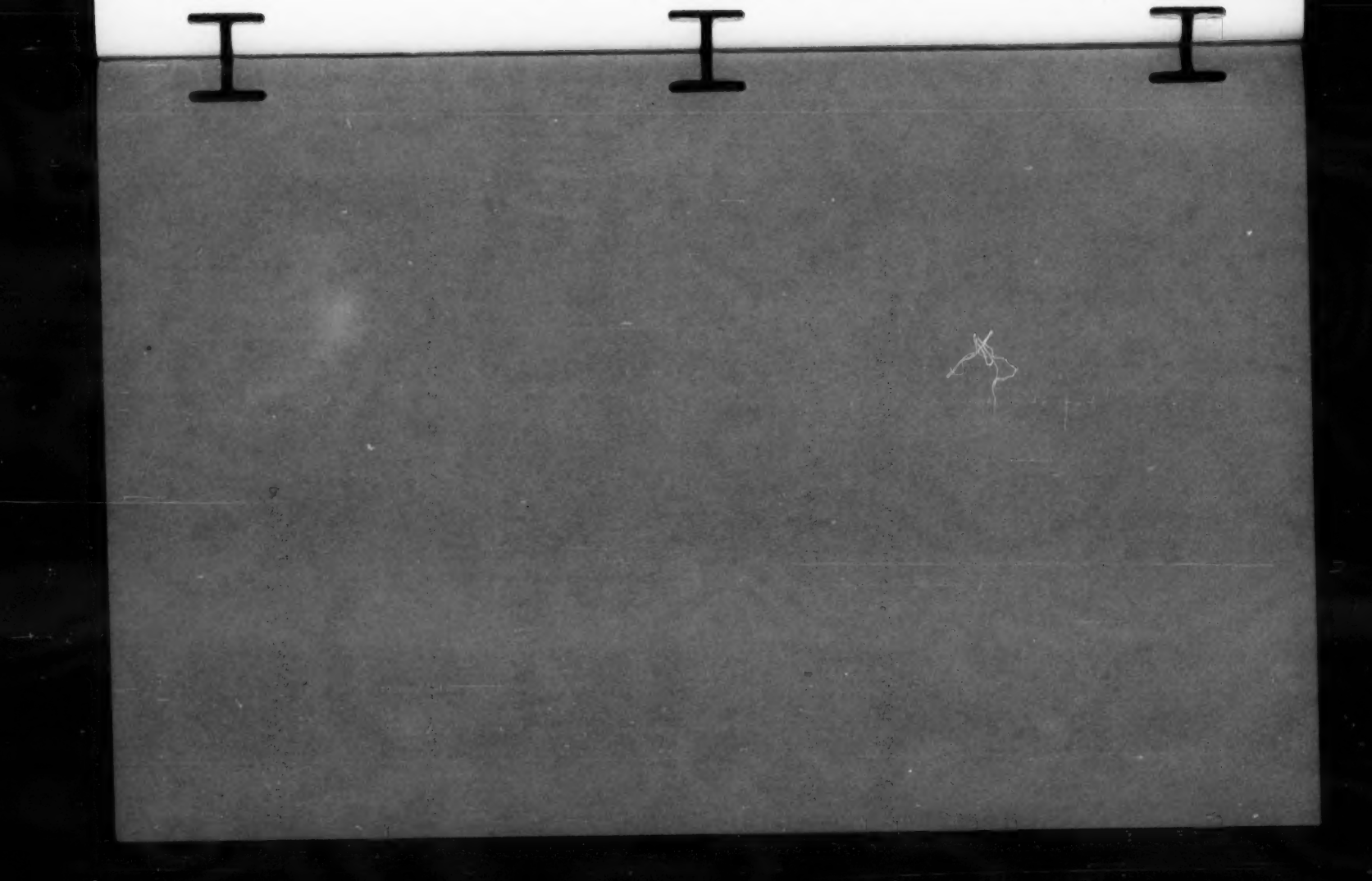

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